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326. Proposed by C. N. SCHMALL, New York City.

$$\text{Prove} \int_0^\infty \frac{[(\tan^{-1}ax)^2-(\tan^{-1}bx)^2]dx}{x}=\tfrac{1}{4}\pi^2\,(\log a-\log b).$$

Solution by A. M. HARDING, University of Arkansas, and G. W. HARTWELL, Hamline University, St. Paul, Minnesota.

$$\text{Let } I=\int_0^\infty \frac{(\tan^{-1}ax)^2}{x}dx. \quad \text{Then } \frac{dI}{da}=2\int_0^\infty \tan^{-1}ax.\frac{dx}{\sqrt{(1+a^2x^2)}}$$

$$=\frac{2}{a}\int_0^\infty \tan^{-1}ax.\ \frac{adx}{\sqrt{(1+a^2x^2)}}=\frac{2}{a}.\tfrac{1}{2}(\tan^{-1}ax)^2\Big|_0^\infty=\frac{\pi^2}{4a}.$$

$$\therefore I=\frac{\pi^2}{4}\int_1^a \frac{da}{a}=\tfrac{1}{4}\pi^2\log a.$$

$$\text{Likewise, } J=\int_0^\infty \frac{(\tan^{-1}bx)^2}{x}dx=\frac{\pi^2}{4}\int_1^b \frac{db}{b}=\tfrac{1}{4}\pi^2\log b.$$

$$\therefore \int_0^\infty \frac{[(\tan^{-1}ax)^2-(\tan^{-1}bx)^2]}{x}dx=I-J=\tfrac{1}{4}\pi^2(\log a-\log b).$$

NOTES AND NEWS.

The November, 1912, number of the *Tôhoku Mathematical Journal*, published at Sendai, Japan, contains the following articles: Eine Theorie der linearen Integralgleichungen mit unsymmetrischen Kern, by A. Korn; New proofs of the invariants of the abelian group, by G. A. Miller; On the limits of the roots of an algebraic equation with positive coefficients, by S. Kakeya; A determinant and its application to the theory of homogeneous linear differential equations, by M. Shibayama; On some curves of constant breadth, by M. Fujiwara; Note on Stewart's and Luchterhandt's theorems, by K. Ogura; Un lien géométrique élémentaire. Avec un note du redacteur, by T. Kono; Notes on some points in the differential calculus, by T. Hayashi. This journal is of especial interest because it reflects the rapid mathematical developments in Japan. M.

Professor Slaught, in his "Retrospect and Prospect," has summed up pretty well the past history of the MONTHLY and he also sets forth very clearly what may be expected in the future. We trust that his hopes and aspirations may be fully realized. The personnel of the editorial board, the energy and enthusiasm of the new Managing Editor, and the influence of the forces that are now giving it financial support, all conspire to presage for the MONTHLY a very useful and successful future. Yet with all the the bright prospects for its future, it cannot render the service designed and must ultimately perish, unless the great army of teachers of mathematics in the high schools and colleges of this country all unite in contributing to its welfare.

It seems to me that it is a sad commentary on the present status of the qualifications of the teachers of mathematics in our high schools, academies, normal schools, and colleges, that so few of them were at any time enrolled on our list of subscribers, and it is no excuse to say that the contributions to the MONTHLY were of too technical a nature to be of interest to these teachers; for, we have it from *School Science and Mathematics* that that journal, at first, fared no better at the hands of the average mathematics teacher. We are glad to know, however, that condititions are changing and that there are progressive forces at work in the world of mathematics teaching as well as in the world of politics and society. On the other hand, in contra distinction to the apathy and lethargy of the teachers of mathematics in high schools, normal schools, and colleges, many of the head professors of mathematics in our leading universities not only secured subscriptions for their university libraries, but were themselves regular subscribers through all the years of its existence. Among many of these, we mention Professor E. H. Moore, of the University of Chicago; Professor W. E. Byerly, of Harvard; Professor Edwin S. Crawley of the University of Pennsylvania; and, while living, Professor H. A. Newton, of Yale, and Irving Stringham, of the University of California.

When this journal was started, nineteen years ago, an urgent appeal was made to the teachers of mathematics in our high schools and colleges to send in contributions and to call for discussions of subjects in which they were specially interested, but, these teachers as a class, failed to respond. We are safe in saying that we have never had, during the nineteen years, a dozen high school teachers of mathematics on our subscription list at any one time. This fact points to what we have many times called attention, viz. the lack of preparation on the part of many of these teachers for the work they are supposed to be doing. Perhaps many of them hide behind the old adage, "Fear the man of few books," and for one, we fear those teachers in any department of knowledge who have few books and who are taking no journal or magazine devoted to their particular line of work. Such we fear and would avoid as we would the bubonic plague, for their infection on the rising generation is no less deadly. A partial remedy for this disease, which, in the end, will work a complete cure, is for college and university professors to refuse to recommend candidates for such positions whose interests in mathematicr do not lie beyond earning a living or social standing. We are teaching because we love it for its own sake. We have spent a great deal of money for books and magazines. Not every teacher would need to spend as much, but every teacher who has the interest of the growing mind at heart will always keep himself in touch with the very best methods of securing that growth and development; and how can such information be better secured than by taking some live journal devoted to the subject he is teaching?

While we have spoken somewhat deprecatingly of a large number of teachers of mathematics, we have done so not, we hope, in a cynical way. We have simply pointed out a fact which has powerfully impressed itself upon us by personal observation. We believe these conditions will improve in time for already are there signs of better things.

Before bringing these reminiscences to a close, we wish to record our appreciation of a few of the many friends who gave us aid and encouragement in the task of carrying on the publication of the MONTHLY for so many years. It is a fact that the MONTHLY has been continued for nearly twice as long a period as any other mathematical journal published under private control, in this country; and had the reorganization not taken place this year and had Editor Slaught withdrawn, the MONTHLY would have gone on as it has with the hope that some day such an arrangement as the present one would be consummated.

When we had under advisement the publication of the MONTHLY and the object which it was wished to accomplish thereby, our first encouragement came in the way of a cash subscription from that well-known scholarly educator of the Middle West, Superintendent J. M. Greenwood, of Kansas City, Missouri. We are delighted to record the fact that our first subscriber was this eminently successful educator and scholar. We wish here also to speak most appreciatively of one other splendid personage, whom, we fear, will never receive the universal recognition and homage due him in this life, but who (a prophet is not without honor save in his own country) is highly honored and esteemed by the great savants of Europe and the far East. We refer to our good friend, Dr. George Bruce Halsted, who, while professor of mathematics in the University of Texas, shared with us equally for a number of years, the annual deficit, and we are glad, in this public way, to express to him our sincere appreciation for his unselfish devotion and kindly interest in the MONTHLY. Not only did he help the MONTHLY financially, but he also contributed numerous articles which have attracted considerable attention both at home and abroad.

In this connection, we wish to thank our friends, Doctors Dickson, Slaught, and Miller, for the very excellent service they have all rendered to the MONTHLY and through it to the mathematical teaching of this country. As Professor Slaught well says, Dr. Dickson's editorial connection with the MONTHLY was most fortunate. Though only a very young man, his high attainments as a mathematician of the first rank added greatly to the influence of the MONTHLY, and it was with the deepest regret that we received from him the word that owing to increased duties in the University, he was obliged to give up the extra work which the MONTHLY entailed. His connection with the MONTHLY began with the October number of Volume IX, for a statement of which see that number.

His successor, Professor Slaught, has been no less energetic, and, if anything, even more enthusiastic. As he says, he has worked, and talked, and sought aid for the MONTHLY morning, noon, and night, and by his efforts additional financial aid came to us through the University of Illinois. By this means also, Dr. Miller was added to the editorial staff to the still further great advantage of the MONTHLY.

Also to Mr. J. M. Colaw, who in the early days rendered invaluable assistance in securing subscribers and thus enlarging the MONTHLY'S clientele; and to Dr. Epsteen and Dr. Glenn for their work during our two year's leave of absence from Drury College.

In considering all the agencies which have contributed to the success of the MONTHLY, it would be very unjust not to consider the two printers, who, in these last nineteen years did the printing of the journal. Had it not been for the sacrifices, first, of Mr. Ed. J. Chubbuck, of Kidder, Missouri, and second, of Mr. S. A. Dixon, of Springfield, Missouri, the MONTHLY could never have been founded and continued.

Mr. Chubbuck undertook the publication of the MONTHLY on a basis which brought him for the first volume scarcely $300. He published the first ten numbers of the second volume at about the same rate. When we came to Drury College in 1895, Mr. Dixon joined us in the sacrificial work. We contracted with him for a 32-page issue for $30. But the price of labor and material quickly rose and we were obliged to increase the price of publication, which price always exceeded the income from the gradually increasing subscriptions. We were thus forced to either increase the subscription price or decrease the number of pages per issue. We chose the latter alternative. During all these more than seventeen years, Mr. Dixon never received commercial price for the work he did on the MONTHLY. Being an unusually swift and accurate type-setter himself, he set the type for the MONTHLY with his own hands, and thus was enabled to carry on its publication without serious financial outlay to himself. Could we have paid him commercial rates for his work he would have been able to furnish himself with outside labor and with a larger assortment of type. Under these conditions we do not hesitate to say that he would have turned out his work in the way of typographical neatness and style which could not have been excelled by the most elaborately equipped establishments in the country.

While there has often been exasperating delays in its publication, be it never forgotten that the publication of the MONTHLY has always been a "labor of love" on the part of both printers and editors.

To all these friends, and to Mrs. Finkel, who helped us in the proofreading of nearly every page, as well as to all who have in any way given us aid and encouragement, we hereby extend our sincerest thanks, and we bespeak for the MONTHLY under the new organization an enlarged and potent field of future usefulness. We invite all our old friends to enlist with us in the new venture.

With kindest greetings of the season, and wishing all a Happy New Year, we remain, Very sincerely,

B. F. FINKEL.

BOOKS.

Elementary Textbook on the Calculus. By Virgil Snyder, Ph. D., and John Irwin Hütchinson, Ph. D., of Cornell University. 8vo. Cloth Sides, Leather Back. 384 pages. Price, $2.00. New York and Chicago: The American Book Co.

In view of the ever-increasing demand to curtail mathematical study as a pure science, for all students taking preprofessional courses, the authors of this text have endeavored to present the calculus in as simple, direct, accurate, and rigorous form as possible. They present the derivative as a limit, an idea easily grasped by the average student, and stimulate the student's interest by applications to maxima and minima, tangents, normals, etc., and they have intentionally avoided making the calculus a treatise on mechanics. The problems and illustrations are suitably chosen and well adapted to the growing mastery of the student. F.

Important Mathematical Discoveries. Part I. Preliminary Demonstrations Leading to Equalizing of Curved Lines to Straight Lines; Part II. Perimeters and Circumferences made Equal to Straight Lines; Part III. The Trisection of an Angle; Part IV. The Quadrature and Duplication of the Cube. By P. D. Woodlock, Columbia, Mo.

The author of this little volume of 39 pages thinks he has added something new to mathematical science, and that he has settled some of those recondite questions that have baffled the mathematical geniuses of the past two thousand years. Being a resident of the home of the Missouri State University, it seems rather strange that the author has not invited a single one of the professors of that institution to confirm the accuracy of his wonderful discoveries. F.

Practical Geometry and Graphics. By David Allan Low (Whitworth Scholar), M. I. Mech. E., Professor of Engineering, East London College (University of London). With over 800 Illustrations and over 700 exercises. 8vo. Cloth, vii+448 pages. Price, $2.50. New York: Longmans, Green & Co.

The field covered by this book is very wide as may be seen from the table of contents. Thus in the Introduction, the author describes some of the instruments used and defines some of the terms. Then follows treatment of the Circle; Conic Sections; Tracing Paper Problems; Approximate Solutions of Some of the Unsolved Problems; Roulettes and Glissettes; Vector Geometry; Graphic Statics; Plane Coördinate Geometry; Periodic Motion; Projection; Projections of Points and Lines; Projections of Simple Solids in Simple Positions; Changing the Plane of Projection; Planes other than the Coördinate Planes; Straight Line and Plane; Sections of Solids; The Sphere, Cylinder, and Cone; Special Projections of Plane Figures and Solids; Horizontal Projections; Pictorial Projections; Perspective Pro-